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Ferroelectricity News

A quarterly update on what's happening in the field of ferroelectricity

Volume 7, Number 2

WORLDWIDE FERROELECTRICITY RESEARCH: INTERDISCIPLINARY IN NATURE

Leafing through conference announcements, meeting reports, or symposium proceedings, one cannot help but be struck by the interlacing and overlapping quality of research in the field of ferroelectricity.

One case in point is the article by **Orlando Auciello, James F. Scott,** and **Ramamoorthy Ramesh** called "The Physics of Ferroelectric Memories" published in the July 1998 issue of **Physics Today**. To find out more about it, turn to page 16.

On pages 15 and 16 you will find information on the **latest publications of the Material Research Society (MRS)**, featuring low-dielectric constant materials and topics such as stresses and mechanical properties of thin films. In addition, you might be interested in a free copy of the 1999 MRS Publications Catalog Supplement (see order information on page 16).

From the National Physical Laboratory in Teddington, Middlesex, UK, comes an invitation to measurement laboratories to cooperate in evaluating methods for determining performance related properties of electroceramics.

Researchers interested in getting involved in the so-called **"Versailles Project,"** will find details on page 14.

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In the section Upcoming Meetings we feature the MRS 1999 Fall Meeting in Boston and two conferences that takes place in Russia: the **15th Russian Conference on Physics and Ferroelectrics** and **Piezotechnology 99**, both held at the same time and place from 14 - 18 September 1999 in Azov near Rostov-on-Don.

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As has become the custom in the *Ferroelectricity Newsletter*, the major part of each issue is taken up with listing the titles and authors of presentations at a variety of conferences. This issue is no exception. You will find the oral and poster papers given at the **11th International Symposium on Integrated Ferroelectrics**, held from 7 - 10 March 1999 in Colorado Springs, Colorado, USA. In the next issue we plan to bring you the list of presentations delivered at the **Sixth Japanese - CIS/Baltic Symposium on Ferroelectricity** that took place in Noda, Japan, from 22 - 25 March 1998. These proceedings were published in Volume 218, Numbers 1-4 (1998) of *Ferro-electrics*.

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Rudolf Panholzer
Editor-in-Chief

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ISIF'99 PAPERS

The following is a list of the titles and authors of the presentations given at the 11th International Symposium on Integrated Ferroelectrics (ISIF'99) held from 7-10 March 1999 in Colorado Springs, Colorado, USA.

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Development Challenges of
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B. Melnick

Retention Performance of SBTN
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Piezoelectric and Pyroelectric Thin
Films for Sensors and Actuators

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Integration of Ferroelectric Random
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PLENARY SESSION II

High-Density FeRAMs

C. Paz de Araujo

Technology Perspective for 1T/1C
FRAMs

K. Kim

PLENARY SESSION III

Studies of Ferroelectric Thin Film
and Film-Based Device Processes
Via *in situ* Analytical Techniques

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Integration Technology for Ferro-
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H. Hada and T. Kunio

A 3v 1T/1C 256Kbit FeRAM
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Kye, W.S. Kang, and N.S. Kang*

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*W. Kraus, L. Lehman, D.
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E. Nagai, H. Yamazaki, and H.*

*D.C. Kim, H.J. Nam, H.M. Lee,
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Kang, and K.Y. Oh*

Advanced LSI Embedded with
FeRAM for Contactless IC Cards
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*Y. Shimada, K. Arita, E. Fujii, T.
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Izutusu, K. Nakao, K. Tanaka, T.
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Evolution of the Integration of
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D. White, and S. Mitra

A Demonstration of Low Voltage
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K. Aizawa, and H. Ishiwara

Ferroelectric-Gate Transistor as a Capacitor-less DRAM Cell

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I. Chung, C.J. Kim, T-Y. Kim, Y. Park, and C.W. Chung

Crystalline Oxides on Silicon - Alternative Dielectrics for a Ferro-Gated Transistor Technology

R.A. McKee, F.J. Walker, and M.F. Chisholm

Epitaxial BaTiO₃ Films on Silicon for MFSFET Applications

J. Hallmark, J. Yu, R. Droopad, J. Ramdani, J. Curless, C. Overgaard, J. Finder, D. Marshall, J. Wang, and B. Ooms

Ferroelectric Self-Field Effect: Implications for Size Effect and Memory Device

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Graded Ferroelectrics: A New Class of Steady-State Thermal/Electrical/Mechanical Energy Interchange Devices

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Graded Ferroelectric Thin Films Grown by Molecular Beam Epitaxy

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Dielectric Properties of (Ba,Sr)TiO₃ Thin Films for tunable Microwave Applications

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Evidence of a Ferroelectric Phase Transition in Fiber-Textured (Ba_xSr_{1-x})Ti_{1-y}O_{3+z} Thin Films on Pt/SiO₂/Si

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The Temperature Dependence of the Dielectric Properties of (Ba,Sr)TiO₃ Thin Films

T. M. Shaw, J. D. Baniecki, R. B. Laibowitz, D. E. Kotecki, H. Shen, and J. Lian

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Effect of N₂O on RF-Magnetron Sputtered SrTiO₃ Films for ULSI DRAM Application

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*A.I. Kingon, S-H. Kim, D.J.
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*T.J. Leedham, A.C. Jones, H.O.
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*S. Narayan, L. McMillan, C.A.
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*T. Eshita, H. Yamawaki, S.
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*T. Jimbo, H. Sano, H. Ishiwara,
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*S. Wang, T.A. Rabson, Q. Su, and
M.A. Robert*

Growth and Optical Waveguiding
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*E. Dogheche, D. Remiens, and
X. Lansiaux*

Hasenkox,

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D.V. Taylor

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S. Mitra an

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Adriaensse*

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*B-T. Jang,
Lee*

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Electrical Properties of (Ba,Sr)TiO₃ Thin Films Doped by Ion Implantation

J.D. Baniecki, Q.Y. Ma, R.B. Laibowitz, T.M. Shaw, P.R. Duncombe, D.E. Kotecki, H. Shen, and J. Lian

Dielectric Properties of Sr_{n+1}Ti_{3n+1}O_{3n+1} Thin Films Grown by MBE

J.H. Haeni, D.G. Schlom, W. Tian, X.Q. Pan, H. Chang, I. Takeuchi, and X-D. Xiang

Electrode Effects on the Low-Frequency Dielectric Properties of (Ba,Sr)(TiO₃) Thin Films Prepared by Pulsed Laser Ablation

S.J. Lee, K.Y. Kang, S.D. Jung, J-W. Kim, and S-K. Han

Reliability of High Dielectric Ba_{0.5}Sr_{0.5}TiO₃ Capacitors Using Iridium Electrode

S.Y. Cha, B-T. Jang, and H.C. Lee

Structural Properties of Ba_{0.6}Sr_{0.4}TiO₃ Thin Films on Epitaxial RuO₂ Electrodes

Q.X. Jia, C. Kwon, and P. Lu

High Dielectric (Ba_{1-x}Sr_x)(Ti_{1-x}Zr_x)O₃ Thin Film Capacitors for Semiconductor Memory Device Applications

J-S. Kim and S-G. Yoon

BST Thin Films with Conducting Perovskite Electrodes for DRAM Applications

B. Nagaraj, T.K. Song, T. Sawney, S. Aggarwal, R.

Low-Temperature Growth of (101)-Oriented Barium Titanate Thin Films on Silicon (111) Substrates by Rf Magnetron Sputtering

J-T. Lee, Q. Su, T.A. Rabson, and M.A. Robert

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Graded Pb(Zr,Ti)O₃ Thin Films

M. Brazier, M. McElfresh, and S. Mansour

A Method for Depositing Compositionally Varied Multi-Layered Oxide Thin Films

M. Brazier, M. McElfresh, and S. Mansour

Electrical Characteristics of Graded PZT Pressure Sensor

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Asymmetric C-V Characteristics of Graded PZT Thin Film Capacitors

Z. Chen, K. Arita, M. Lim, and C. Paz de Araujo

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High Frequency Ultrasonics Using PZT Sol-Gel Composites

M. Lukacs, M. Sayer, and S. Foster

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H. Ma A.I. Ki Neuma

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G. Sub Keuls, Caned Venka

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A. Koz Ivanov Pruda

Microwave (Ba,Sr)TiO₃

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*X. Zhang, Y. Zhu, S. Stowell, S.
Sengupta, T.V. Rivkin, C.M.
Carlson, P.A. Parilla, and D.S.
Ginley*

Growth and Characterization of
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*P.K. Baumann, S.K. Streiffer, O.
Auciello, M.T. Lanagan, J.
Giumarra, R.A. Erck, J. Im, and
A.R. Krauss*

Ferroelectric Lens Antenna with
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*J.B.L. Rao, D.P. Patel, L.C.
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Zhu, S. Stowell, and S. Sengupta*

Ferroelectric Thick and Thin Film
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*L.C. Sengupta, L. Chiu, X.
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*C.M. Carlson, J.C. Price, T.V.
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*C.L. Canedy, S. Aggarwal, A.
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Riba, T., Venkatesan, R. Ramesh,
F.W. Van Keuls, R.R.
Romanofsky, N.D. Varaljay, and
F.A. Miranda*

The Effects of Various Dopants on
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*F. Barnes, R. Benton, H.-D. Wu,
and S. Chumchuensuk*

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*Y.S. Ahn, D.
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and E. Yoo*

Growth of LiNb
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*Y. Gim, K.T
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Q.X. Jia*

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on the Pyroelectric Properties of
Lead Titanate Based Devices

*R.P. Godrey, C.L. Canedy, C.
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Ramesh -C.W. Tipton, and R.C.
Hoffman*

POSTERS: MATERIALS PROCESSING - CHEMICAL SOLUTION DEPOSITION

Epitaxial Growth of SBT Thin
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*J.H. Kim, F.F. Lange, and C. I.
Cheon*

Temperature and Frequency Stable
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*Y.W. Shin, A.C. Kirby, and S.K.
Dey*

Crystallization Behavior of Alkoxy-
Derived SrBi₂Ta₂O₉ Thin Films on
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Synthesis of Controlled Carbon
Content MOD Precursor Solutions
for Bismuth Layered Structures

*T. K. Dougherty, O.G. Ramer,
and J. Drab*

*K. Matsuura, H. Ashida, and S.
Otan*

The Solvent Effect on the PZT
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*W-W. Zhuang, R. Barrowcliff,
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*R. Barz, S.K. Dey, and D.
Neumayer*

Intrinsic Stress Dependence of Pt
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*S.Y. Kweon, S.J. Yeom, H.J. Sun,
N.K. Kim, Y.S. Yu, and S.K. Lee*

XRD Data and Low-Temperature
Phase of Sr-Bi-Ta-O Films

*J.S. Lee, H.J. Kwon, H.H. Kim,
and Y.W. Jeong*

Investigation of Growth Evolution
in c-Axis SrBi₂Nb₂O₉ Epitaxial
Thin Films

*J. Lettieri, Y. Jia, D.G. Schlom,
G.W. Brown, M.E. Hawley, R.
Uecker, and P. Reiche*

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Q. Tan

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Capacitor
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Pb(Zr,Ti)O
G.J. H

Influences
SrBi₂Ta
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Investigation into the Reliability of Ferroelectric Memories

D. Dalton, and T. Davenport

Local Charge Compensation-Assisted Cation Place Exchange and Ferroelectric Fatigue Resistance of SBT

A.C. Palanduz, and D. M. Smyth

Accurate Electrical Characterization of (Ba,Sr)TiO₃ Films Utilizing Transmission Matrices

A.C. Kirby and S.K. Dey

Polarization Relaxation in PZT Thin Film Capacitors

I. Jenkins, V. Nagarajan, S. Aggarwal, B. Nagaraj, T.K. Song, and R. Ramesh

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The Switching Characteristics of SrBi₂Ta₂O₇ Thin Film Prepared by MOD Method

X.B. Chen, F. Yan, Z.G. Zhang, J.S. Zhu, and Y.N. Wang

Studies of Retention Behavior of SrBi₂Ta₂O₇ Thin Films

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Fatigue Induced Evolution of the Domain Structure in Epitaxial Thin Films

V.Y. Shur, S.D. Makarov, N.Y. Ponomarev, E.V. Nikolaeva, E.I. Shishkin, L.A. Suslov, N.N. Salaschenko, and E.V. Kluev

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Interfacial Control of SrBi₂Ta₂O₇ Based Field Effect Transistor with YSZ, CeO₂ Buffer Layer

J-K. Lee, S-M. Jang, J-H. Kim, and H-J. Jung

Effect of Crystallinity on Ferroelectric Thin Film Transistor

H. Fujisawa, S. Aggarwal, and R. Ramesh

The Integration of SrBi₂Ta₂O₇ / Insulators/Si Structure for MFIS in NDRO-Type FRAM

W-J. Lee, C-R. Cho, C.H. Shin,

SBT-Based Ferroelectric Nonvolatile Memory (NDRO) Memory

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TEM Observation of Films Grown on Y₂O₃ Buffer Layer

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Integrating Part of a Metal-Ferroelectric Field Effect

T. C. MacL

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Preparation and Properties of Strontium Bismuth Tantalum

C-H. Lu and

Influence of the Oxide on Properties of La Bismuth Tantalum

Y-C. Chen and

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Reversible and Irreversible Domain
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Ba_{1-x}Pb_xTiO₃ Thin Films
*M. Hoffmann, D. Bolten, U.
Hasenkox, O. Lohse, and*

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Pt/PZT/TiO₂ Gate Stack Etching by
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Ferroelectric-Insulator-Semiconduc-
tor (MFIS) FETs

*C.W. Chung, T-Y. Kim, C.J. Kim,
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*J. Goswam
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*P. Lu, S. He, F.X. Li, and Q.X.
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Effect of Rf Power on the Micro-
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of SBT Thin Films by **Plasma-**
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Vapor Deposition
W-C. Shin and S-G. Yoon

Fabrication of Ferroelectric YMnO₃
Thin Films for Nonvolatile Memory
Devices by MOCVD and
PEMOCVD

*G-J. Choi, W-C. Shin, and S-G.
Yoon*

Developm
Long Life
Delivery S
Systems

*F.P. G
G.S. T
Zhang
Desu,*

PIEZOELECTRICITY AND PYROELECTRICITY DATABASE (PPDB)

The database used in Professor Sidney B. Lang's "
which appears semiannually in

Guide to the Literature of Piezoelectricity and

Ferroelectrics

is now accessible on the Gordon and Breach Internet Web

The current version of the Piezoelectricity and Pyroelectricity Database (PPDB) contains references to most of the publications on piezoelectricity and pyroelectricity during the period 1990-1996. The database will be updated with an additional 500-1000 new references about twice a year. In order to make the database as comprehensive as possible, references are included even if piezoelectricity and/or pyroelectricity formed a very minor part of the contents of the publication. The current database contains 10722 references.

References are given for articles in journals, chapters in proceedings or books, books, patents, theses and reports. Full bibliographic information is given so that the reader can locate the publication. Additional information such as conference presentation data, language (if other than English) and patent assignees is given where available.

The URL for accessing PPDB is

http://www.gbhap-us.com/c3/lit_guide/

Information in the PPDB can be accessed in two ways: (1) Direct search of the database on the Internet or (2) Downloading of the entire database and a public-domain search engine to the user's computer. Full instructions are supplied.

Any problems with the PPDB or suggestions should be sent to:

Prof. Sidney B. Lang

Department of Chemical Engineering, Ben-Gurion University of the Negev, 84105 Beer Sheva, Israel
fax: +972-7-647-2916; email: lang@bgumail.bgu.ac.il

Volumes 217, 218, and 219, Numbers 1 - 4 (1998)
of *Ferroelectrics* contain the proceedings of

The Sixth Japanese - CIS/Baltic Symposium on Ferroelectricity

held in Noda, Japan
22 - 25 March 1998

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VERSAILLES PROJECT

VERSAILLES PROJECT ON ADVANCED MATERIALS AND STANDARDS

Mark Gee and Markys G. Cain of the National Physical Laboratory in Teddington, UK, are initiating a project to evaluate measurement methods for determining the performance related properties of electroceramics. They are planning to enlist the cooperation of measurement laboratories interested in this project.

Electroceramics, such as piezoelectric and electrostrictive materials, have the capability of converting electrical energy into mechanical energy (or vice versa). The technological importance of these materials is increasing, with widespread applications in actuator and sensor applications.

Although there has been some standardization activity

projects cannot be fully predicted in advance of the survey. However, it is expected that work will be carried out at least on the development of recommended procedures for the following four projects:

1. Measurement of piezoelectric coefficients of differing geometries and configurations including the assessment of direct and converse coefficients

through bodies such as the IEEE, and more recently through CENELEC in the development of new standards, many of the most important properties that are required for these materials when used as sensors and actuators remain without internationally recognized test methods.

Measurements where work is required include:

- * direct and converse piezoelectric coefficient measurement
- * high stress dielectric property measurement
- * the measurement of strain at high stresses, and
- * the measurement of degradation of materials performance under repeated electrical and mechanical loading.

Industries that would benefit from these activities are the manufacturers of materials, sensors, actuators, and any industries that incorporate devices based on these materials.

Although further practical measurement-based projects would be expected to follow, the subject of these

2. Measurement of piezoelectric strain cal/mechanical stress
3. Measurement of piezoelectric and di ties at high stress
4. Measurement of electrical and mech piezoelectric ceramics materials.

Appropriate links would be developed with of the CENELEC committee (Alan Thomas) route forward to the development of standard prestandardization work performed in the Te Area is straightforward.

It is expected that the development of standa would proceed from Autumn 1999 with an e lifetime of 2-3 years.

Please direct any inquiries to:
Mark Gee & Markys G. Cain
National Physical Laboratory
Queens Road, Teddington, Middlesex, TW1
United Kingdom
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email: markys.cain@npl.co.uk

Volume 220, Numbers 3-4 (1999) of ***Ferroelectrics***
is a special issue on
Ferroelectric and Related Models in Biological Systems

A collection of papers from the
Second Workshop on Nonlinear Models of Biomembrane Molecular Structures
held in Pushchino, Russia, 26 June - 1 July 1995
&
The Workshop on Condensed-state Models of Voltage-dependent Ion Channels
Kansas City, Missouri, USA, 25 February 1998

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NEW RELEASES FROM THE MATERIALS RESEARCH SOCIETY

MRS Expands Series on Thin Films-Stresses and Mechanical Properties

The newest volume is a continuing series from the Materials Research Society, *Thin Films-Stresses and Mechanical Properties VII*, documents symposium reports from the 1997 MRS Fall Meeting in Boston, Massachusetts, and contains 95 papers, 646 pages.

Mechanical behavior in thin films continues to be a growing field of interest in the materials research community. This behavior can critically influence the design, performance, and reliability of thin-film structures used in every area of thin-film technology. Examples of affected areas include semiconductor and magnetic recording technology, as well as protective and hard-coating technology. As a result, it has become important to study and attempt to understand fundamental issues involved in film-substrate adhesion, the development of intrinsic stresses, and the mechanisms of plastic deformation, strain relaxation, and fracture in thin films.

This volume, the seventh in a popular series from the MRS, brings together an international group of researchers and students from industry, academia, and national laboratories to address the issues at hand. A great deal of work is directed toward improving existing, as well as developing new, mechanical property characterization techniques, such as more sensitive ultrasonic methods for elastic behavior determination and low-load indentation methods to investigate yield, creep, and fracture behavior. Experimental, theoretical, and modeling work is presented. Topics include: novel testing methods; low-load indentation; metallization and reliability; structural and mechanical stability; stresses and mechanical behavior; surface and tribological properties; adhesion; deformation mechanisms; stresses in thin films-generation mechanisms and measurement techniques; modeling and simulation; multilayered and superlattice thin films; and structure/property/processing relationships.

Edited by Robert C. Cammarata (Naval Research Laboratory), Michael A. Nastasi (Los Alamos National Laboratory), Esteban P. Busso (Imperial College, University of

Symposium Proceedings Series. I hardcover or microfiche for \$62.00 (US list), and \$82.00 (No

MRS Introduces New Additions to Low-Dielectric Constant Materials Series

The latest edition in the continuing Materials Research Society, *Low-Dielectric Constant Materials IV*, documents symposium reports from the 1998 MRS Spring Meeting in San Francisco, and contains 49 papers, 386 p

While this volume continues the science related to the development of low-k constant materials, it part four major areas: polymeric and dielectrics; metrology and characterization; integration and low-k interconnects. These are in the development of low-k dielectrics, where materials and process play a tant role in controlling the structural reliability of the interconnect. The series is edited by invited and contributed papers from universities and industry, illustrating the interdisciplinary nature of the field.

Edited by Chien Chiang (Intel Corporation), Chien Ho (University of Texas-Austin), and Robert Wetzelschlag (Rensselaer-Polytechnic Institute), *Low-Dielectric Constant Materials IV* (ISBN: 1-55899-111-1) is available in hardcover or microfiche (US list), and \$

For further information, or to place an order, contact:

Materials Research Society
Customer Services Department
506 Keystone Drive
Warrendale, PA 15086

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PUBLICATIONS

1999 MRS Publications Catalog Supplement Now Available

The **1999 Materials Research Society (MRS) Publications Catalog Supplement**, containing 72 new books—all exploring interdisciplinary research on advanced materials—is now available. The volumes span many subject areas, including biomedical materials, catalysts, ceramics and composites, computational methods, electronic materials and processing, education, glasses and insulators, materials characterization, metals and alloys, novel processing/applications, nuclear waste management, polymers, sensors, and more.

Also featured in this Supplement is the new **Proceedings of the 12th International Zeolite Conference**. With four volumes and more than 3360 pages, this proceedings is one of the largest collections on zeolite science ever assembled.

To receive a free copy of the 24-page catalog, contact the Material Research Society, Customer Services Department. (For address, phone, and fax, see previous page.)

Proceed-

Ferroelectric Memories Featured in

Orlando Auciello (Argonne National Laboratory, Argonne, Illinois, USA), **James F. S. M. Azevedo** (New South Wales, Sydney, Australia), and **Ramesh** (University of Maryland, College Park, USA) published an article called **"Ferroelectric Memories"** in the July issue of **Physics Today**.

After discussing basic ferroelectric physics, the article explains how NVFRAMs work and gives an overview of early developments in the field of ferroelectric memories. Capacitor degradation and extending the polarization retention time were obstacles which could not be overcome by using thin-film technology. But that was not all the problems. Today there are still basic problems related to ferroelectric memories which we do not completely understand. The authors deal with these challenges, describe the current state of thin-film technology and industrial ferroelectric memories, and conclude with an evaluation of the role ferroelectric memories will play in the future. The article features two boxes: "DRAMs based on ferroelectric materials with high permittivity" and "Other applications of ferroelectric materials."

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including all back issues is available on Internet

<http://www.sp.nps.navy.mil/projects/ferro/ferro.html>

in Adobe Acrobat PDF file format

The PDF file format maintains the graphics and organization of the printed newsletter. Adobe Acrobat Reader is a helper application distributed free for Web browsers. Acrobat is available for Macintosh, Windows, DOS, SGI, and Sun SPARC operating systems.

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fax: +831-655-3734 e-mail: liebmann@redshift.com

or rpanholzer@nps.navy.mil

mail: Hannah Liebmann, 500 Glenwood Circle, Suite 238, Monterey, CA 93940-4724 USA

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UPCOMING MEETINGS

The 15th Russian Conference on Physics of Ferroelectrics

14 - 18 September 1999

Azov, near Rostov-on-Don, Russia

Sponsored by the Ministry of General and Professional Education of Russia, the Scientific Committee of Physics of Ferroelectrics of the Russian Academy of Science, Rostov State University, Rostov State Pedagogical University, the Scientific and Research Institute of Physics at Rostov State University, and the Moscow Institute of Radio Engineering, Electronics and Automatics - Technical University, the 15th Russian Conference on Physics of Ferroelectrics, with the participation of foreign scientists, will be held in Azov from 14 - 18 September 1999.

Topics

- * Physical properties of ferroelectrics
- * Phase transitions and critical phenomena
- * Structure and dynamics of crystal lattice
- * Relaxor ferroelectrics
- * Surface phenomena, nanocrystals, incommensurate phases, etc.
- * Domain structure and processes of switching

- * Physical properties and processes in ceramics and compound materials

Forms of Presentation

- * Plenary presentation (40 minutes)
- * Original presentation (15 minutes)
- * Poster presentation
- * Official languages are Russian and English

Organizing Committee:

K. S. Alexandrov (Krasnoyarsk) - chairman
 A. A. Grekov (Rostov-on-Don) - vice-chairman
 V. P. Sakhnenko (Rostov-on-Don) - vice-chairman
 I. N. Chugueva (Moscow) - scientific secretary
 E. V. Bursian (St. Petersburg)
 T. R. Volk (Moscow)
 S. A. Gridnev (Voronezh)
 V. V. Lemanov (St. Petersburg)
 V. K. Malinovsky (Novosibirsk)
 A. S. Sygov (Moscow)
 B. A. Strukov (Moscow)
 A. V. Shilnikov (Volgograd)
 L. A. Shuvalov (Moscow)
 V. Y. Shur (Ekaterinburg)

Contact

344090, Russia, Rostov-on-Don, Stachky Ave., 194, Institute of Physics of Rostov State University
 phone: 7(86-32)28-06-76; 22-16-42; 28-50-66
 fax: 7(86-32)28-50-44
 email: pan@ip.rsu.ru

UPCOMING MEETINGS

Piezotechnique 99

14 - 18 September 1999

Azov, near Rostov-on-Don, Russia

This international conference covering scientific and practical aspects of fundamental problems of piezoelectricity and its applications is sponsored by the Ministry of General and Professional Education of Russia, the Russian Space Agency, Rostov State University, the Scientific & Technological Bureau Piezopribor at Rostov State University, as well as the Scientific and Research Institute of Physics at Rostov State University.

Topics

- * Theoretical modeling and design of piezoelectric transducers and devices
- * Application of materials for piezotechnique devices
- * Theoretical and experimental investigations on physics of piezoelectric transducers, on polarization processes, and technological aspects of piezomaterials processing
- * Piezoelectric materials science
- * Special instruments for investigation and testing of piezomaterials, sensors and piezoelectric transducers
- * Detecting and transforming devices, nondestructive testing devices, filters, drives, piezomotors, piezotransformers, ultrasound systems, medical equipment and household appliances
- * New directions of piezotechnique (smart materials, hybrid structures, nontraditional piezoelectric systems, nanotechnology, etc.)
- * Exhibition of piezoelectric products (materials, technologies, active elements, devices), presentation and sale of scientific and technical materials (monographs, proceedings, advertisement prospects etc.)

Exhibitions and Company Participation

Domestic and foreign piezoelectric companies are welcome to participate. Companies could present a talk as well as exhibit samples of their products.

Proceedings

The presentations will be published before the beginning of the conference as

Conference Proceed

Organizing Committee

A. E. Panich (Rostov-on-Don) - chairman
V. P. Sakhnenko (Rostov-on-Don) - chairman
A. V. Gorish (Moscow) - vice-chairman
V. K. Dolya (Rostov-on-Don) - vice-chairman
V. Y. Topolov (Rostov-on-Don) - scientific secretary

The 15th Russian Conference on Physics of Ferroelectrics

is held simultaneously with

Piezo

pants of Piezotechnique 99 can attend the 15th Russian Conference on Physics and Ferroelectrics without additional fee.

Contact

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Stachki Ave., 194, Rostov-on-Don, 344090, Russia
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Ferroelectricity Newsletter

UPCOMING MEETINGS

Materials Research Society 1999 Fall Meeting

29 November - 3 December 1999

Boston, Massachusetts, USA

The Fall 1999 Materials Research Society Meeting will highlight recent and significant advances in the understanding and synthesis of materials. More than 40 technical symposia will cover a wide range of topics in materials science, including self-assembled and nanostructured materials, surfaces and interfaces, thin-film materials and processes, materials including biological applications, semiconductor devices, ceramics, structural materials, and materials modeling.

New symposia will be offered in many exciting areas, such as biomineralization, the materials science of food, complex fluids, superplasticity, molecular electronics, and smart materials. Popular ongoing series of symposia will continue in nitride semiconductors, ferroelectric thin films, nanophase and nanocomposite materials, high-temperature superconductors, the materials science of MEMS devices, interfacial engineering and epitaxy, and nuclear waste management. Symposia on computer modeling and calculations in materials science will provide a forum for interaction between theorists and experimentalists. Strong interaction among the symposia will highlight the interdisciplinary nature of materials science.

Tutorial sessions in selected areas will provide introductions to new fields. There will be an exhibition of products and services of interest to the materials community, and the popular Symposium X series will feature topics on the forefront of materials science.

Sample of Symposia

- * T: Structure and electronic properties of ultrathin dielectric films on silicon and related structures
- * V: Thin Films-Stresses and mechanical properties VIII
- * Y: Ferroelectric thin films VIII
- * Z: Thin films for optical waveguide devices

Abstracts

For all abstracts submitted by email, fax, or mail, the deadline is **7 June 1999**. Because the deadline for submitting an abstract is via the MRS Website-the choice of more than 90 percent of submitting authors-the deadline for abstracts submitted **via the Website will be extended until 21 June 1999**.

For specific technical information, contact any of the 1999 Fall Meeting Chairs

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Website

www.mrs.org

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CALENDAR OF EVENTS 1999

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| Jun 7-10 | * | Transducers '99: The 10th International Conference on Solid-State Sensors and Actuators, Sendai,
Japan (see <i>Ferroelectricity Newsletter</i> , Vol. 6, No. 3, p.17) | |
| Jun 20-25 | * | Gordon Research Conference on Thin Films and Crystal Growth Mechanisms, Plymouth State College,
Plymouth, New Hampshire, USA
Gordon Research Conferences, University of Rhode Island, PO Box 984, West Kingston, RI
02894-0984; phone: +401-783-4011; email: grc@gremail.grc.uri.edu
Website: http://www.grc.uri.edu | |
| Jun 24-26 | * | 3rd Korea-Japan Conference on Ferroelectrics, Kyungju, Korea (see <i>Ferroelectricity</i>
Vol. 6, Nr. 4, p. 35) | |
| Jul 12-16 | * | 9th European Meeting on Ferroelectricity (EMF-9), Prague, Czech Republic (see
<i>Newsletter</i> . Vol. 6, No. 3, p. 18) | |
| Jul 31-
Aug 1 | * | Short Course on Crystal Growth, Tucson, Arizona, USA (see <i>Ferroelectricity Newslett</i>
No. 3, p. 19) | |
| Aug 1-6 | * | 11th American Conference on Crystal Growth and Epitaxy, Tucson, Arizona, USA (see
<i>Newsletter</i> , Vol. 6, No. 3, p. 19) | |
| Aug 4-13 | * | 18th International Union of Crystallography and General Assembly, Glasgow, Scotland | |

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